

B. L. BOBROFF.
 ELECTRICAL SIGNALING APPARATUS.
 APPLICATION FILED SEPT. 24, 1917.

1,358,134.

Patented Nov. 9, 1920.
 2 SHEETS—SHEET 1.

Fig. 1.

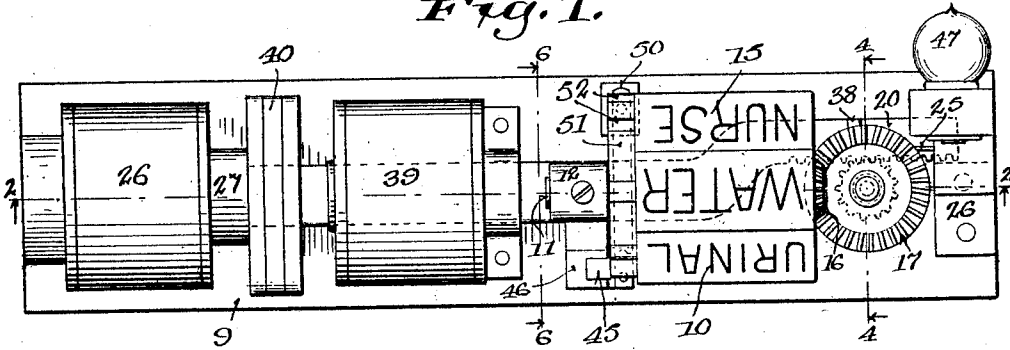


Fig. 2.

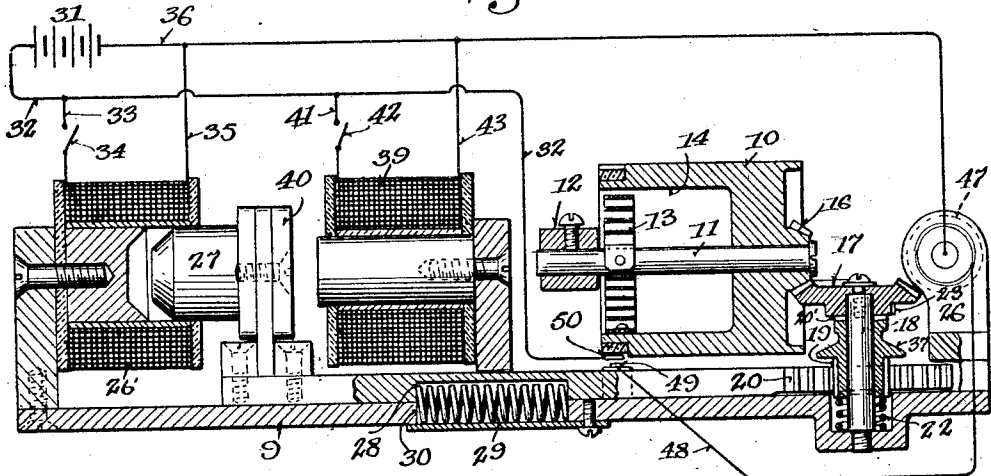
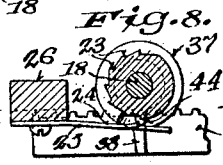
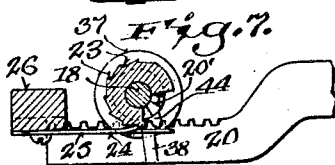
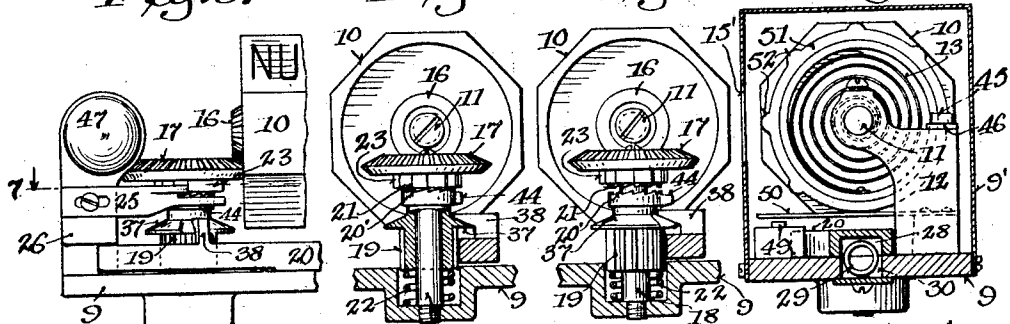


Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.



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 2 SHEETS—SHEET 2.

Fig. 9.

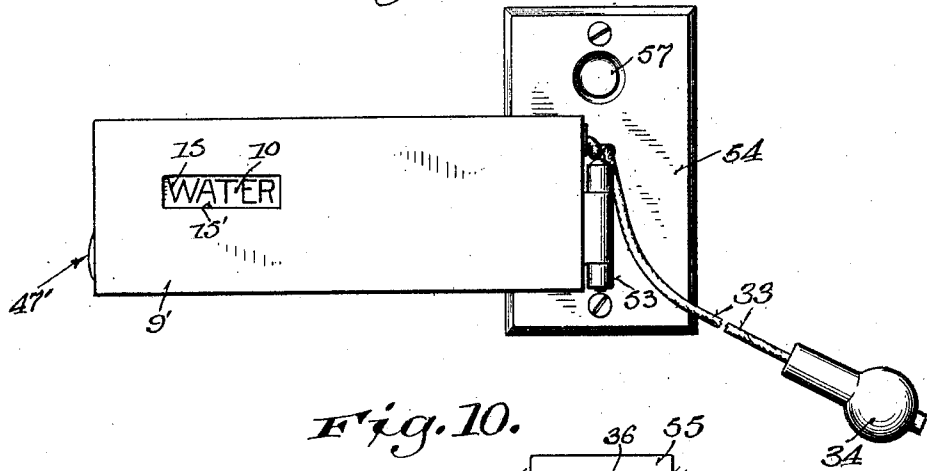


Fig. 10.

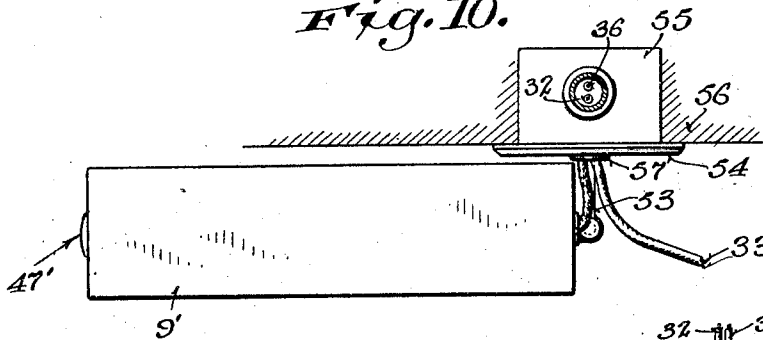
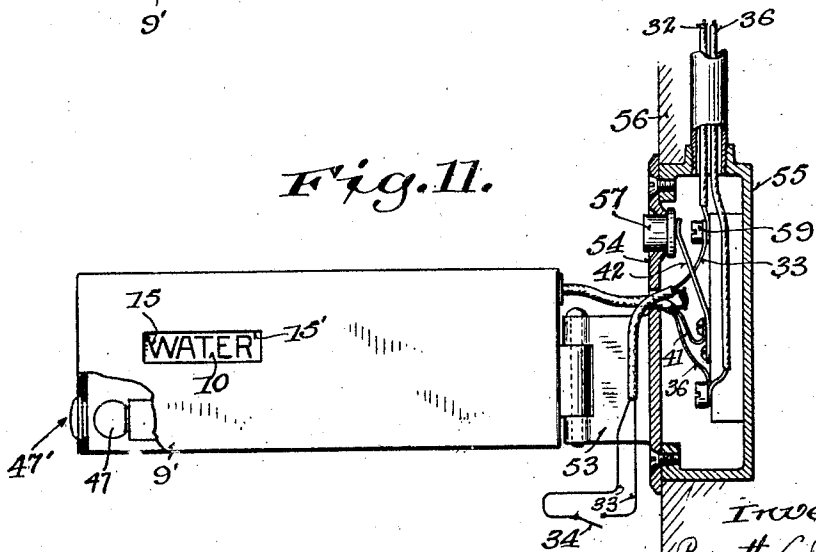


Fig. 11.



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UNITED STATES PATENT OFFICE.

BORNETT L. BOBROFF, OF MILWAUKEE, WISCONSIN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO EDWARD DILLMANN AND HENRY J. TURCK, TRUSTEES, OF MILWAUKEE, WISCONSIN.

ELECTRICAL SIGNALING APPARATUS.

1,358,134.

Specification of Letters Patent.

Patented Nov. 9, 1920.

Application filed September 24, 1917. Serial No. 192,915.

To all whom it may concern:

Be it known that I, BORNETT L. BOBROFF, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Electrical Signaling Apparatus, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

The invention relates to electrically operated signaling apparatus.

The invention is more particularly designed to provide an apparatus for use in hospitals for giving a visible signal of the service desired to a nurse at a distance from the patient and a similar apparatus near the patient to indicate the service desired and is more particularly for use in connection with the electrical signaling system shown and described in my application Serial No. 185,912, filed August 13, 1917. This system is for use in hospitals whereby the patient may easily indicate his wants to the nurse who need only make one trip to supply the patient. The present construction constitutes one of the visible signaling units in the electrical system above referred to.

A further object of the invention is to provide a new and improved support for the apparatus which is located adjacent the bed of the patient.

The invention further consists in the several features hereinafter set forth.

In the drawings:

Figure 1 is a plan view of the device embodying the invention;

Fig. 2 is a section taken on line 2—2 of Fig. 1, showing some of the electrical connections used in the system;

Fig. 3 is a detail side view of a portion of the device;

Fig. 4 is a detail view of the gearing mechanism in the device, parts being shown in section and the gearing connected up for turning the drum;

Fig. 5 is a view similar to Fig. 4 showing parts of the gearing disconnected;

Fig. 6 is a section taken on line 6—6 of Fig. 1;

Figs. 7 and 8 are detail sectional views taken on the line 7—7 of Fig. 2, showing the ratchet lock connected and disconnected respectively;

Fig. 9 is a side view of the apparatus at the patient's or sender's station;

Fig. 10 is a plan view thereof; and

Fig. 11 is a view similar to Fig. 9, parts being shown in section.

The indicator comprises a base 9, which is adapted to carry a suitable casing 9' for inclosing the parts of the indicator, an indicating drum 10 revolubly mounted on a shaft 11 carried by a bracket 12, means for turning the drum to indicate the desired thing wanted by the patient, means for resetting or turning the drum to normal position.

The drum is normally held in inoperative position and automatically returned thereto by means of a spiral spring 13 seated within a recess 14 in one end of the drum and secured at one end of the drum and at the other to the shaft 11. The drum is polygonal in shape and is provided on some of its flat sides with designations 15 of the usual articles wanted by a patient and which will appear through an opening 15' in the casing.

The means for turning the drum 10 consists of a bevel gear 16 carried by the drum meshing with a bevel gear 17 revolubly mounted on a vertical shaft 18 secured to the base 9, a gear 19 mounted on the shaft 18 and operatively connected to the gear 17 through a clutch connection hereinafter described, a rack 20 meshing with the gear 19, and electromagnetically operated means for moving the rack to produce a step by step rotation of the drum.

The gear 17 is provided with a toothed clutch face 21 which registers with a corresponding toothed clutch face 20' carried by the gear 19, the gear 19 being slidably mounted on the shaft 18 and held in engagement with the toothed face 21 by means of a spring 22. The gear 17 is also provided with a plurality of teeth 23 forming a ratchet face, which teeth are successively engaged by a spring pawl 24 formed on a spring member 25 secured to a bracket 26 mounted on the base 9. On the movement of the rack 20 to the left, the gear 19 is turned, and the clutch connection being in, the drum 10 will be turned through the gears 17 and 16 the distance necessary to bring one of the flat faces at the opening in the casing and at the same time move the ratchet a distance of one of the teeth 23 at which time the pawl 24 will engage the next tooth of the ratchet. On the

movement of the rack 20 to the right the gear 19 will be turned in the opposite direction but the drum 10 being held against reverse rotation by locking the gear 17 against movement by means of the pawl 24, the clutch face 20' will move over the clutch face 21 because of the inclination of the tooth faces of the said surfaces.

The electromagnetically operated means for moving the rack comprises a solenoid 26 having a movable core 27 secured to the rack 20. The rack 20 is provided with a recess 28 and a spring 29 is seated in said recess and in a recess 30 in the base 9, the ends of the recess 28 engaging the ends of the spring 29. This spring serves to return the rack to its normal position. When the solenoid is energized the core 27 moves inwardly and the rack 20 moves toward the left to turn the gear 19 and operate the drum as previously described. The solenoid is adapted to be connected up in the system shown and described in the application previously referred to and for the purpose of illustration in the present instance I have shown a battery 31, a conductor 32 leading from one side of the battery and connected to a conductor 33, a switch 34 to open the circuit of the conductor 33, the conductor 33 leading to one terminal of the solenoid and a conductor 35 leading to the other terminal thereof and connected through a conductor 36 with the other side of the battery. On the closing of the switch 34, the current from the battery 31 will energize the solenoid 26 to move the core 27 as just described. On the shutting off of the current the spring 29 which has been under compression moves the rack backwardly or to the right to normal position and turns the gear 19 and not the gear 17 for reasons previously given. In this way the drum 10 is moved step by step and successively displays the designations on its faces through the opening in the casing of the device.

The means for returning the drum 10 to normal or non-indicating position comprises means for throwing out the clutch connection between the gears 17 and 19, and means for releasing the pawl 24 from engagement with any one of the teeth 23.

The means for throwing out the clutch connection between the gear 19 and the gear 17 consists of a cam 37 on the gear 19 which engages a projection 38 carried by the rack when said rack is moved to the right from its normal position for the contacting surfaces of the cam 37 and projection 38 are such that as the rack moves from normal position to the right it pushes the gear 19 downwardly and thus moves its clutch face 20' out of engagement with the clutch face 21 carried by the gear 17. The spring 29 normally holds the rack 20 in normal or neutral position and the movement of the rack

to throw out the clutch connection is effected by the energizing of a release electromagnet 39 cooperating with an armature 40 carried by the rack 20, said electromagnet 39 attracting the armature 40 and moving the rack 20 from normal position to the right against the action of the spring 29. The electromagnet 39 is adapted to be connected up in the electrical system shown and described in my before mentioned application and for the purpose of illustration in this case it is shown connected up to the battery 31 by the conductor 32, a conductor 41 having a switch 42 therein, said conductor leading to one terminal of the magnet and a conductor 43 leading from the other terminal to the conductor 36. When the switch 42 is closed the current from the battery 31 will energize the magnet 39. On the de-energizing of the magnet 39 the spring 29 will move the rack back to normal position and the projection 38 over the cam 37 to permit the gear 19 to be moved upwardly by the spring 22 to throw in the clutch.

The means for releasing the pawl 24 from engagement with any one of the teeth 23 forming the ratchet carried by the gear 17 comprises a cam or projection 44 carried by the gear 19 which engages the spring member 25 to move said member outwardly and consequently the pawl 24 outwardly from engagement with the ratchet formed by the teeth 23 when the rack 20 has been moved from normal position to the right through the actuation of the release magnet 39. With the gears 17 and 19 disengaged from each other and the pawl 24 moved out of engagement with the ratchet the gear 17 is free to turn on the shaft 18 and consequently the drum 10 is also free to turn and is turned by the spring 13 to normal position, the drum having a stop 45 thereon which engages a bumper 46 on the bracket 12 when said drum has reached its normal position.

The indicator is also provided with a visible signal consisting of an electric light 47 which is lighted when the drum 10 is in one of its indicating positions. The means for lighting the electric light 47 consists of the battery 31, conductor 36 leading to one terminal of the lamp, and conductor 48 leading from the other terminal of the lamp to a contact 49, a flexible contact or switch element 50 connected to the conductor 32 and means for bringing the contact 50 into engagement with the contact 49 when the drum is turned to indicating position. This means consists of a disk 51 of insulating material mounted on the drum 10 and provided with a plurality of projections 52 which are successively moved into engagement with the contact 50 on the turning of the drum at which time the contact 50 is moved down into contact with the contact 49 and the circuit through the battery 31 thus closed to light the lamp

47. While I have shown a simple form of circuit for the lamp for illustration purpose it will be understood that the same light circuit may be used as that shown and described in my before mentioned application.

In Figs. 9 to 11 inclusive I have shown the apparatus which is employed adjacent the bed of the patient, the operating mechanism of which is the same as that previously described. In this instance the casing 9' of the apparatus is hingedly connected to a lug 53 integral with the front switch plate 54 which fits over the switch box 55 in the wall 56 of the building. The release push button switch corresponding to the switch 42 in Fig. 2 is here shown as formed by the button 57 slidably movable in the plate 54 and connected to a flexible contact 58 which is adapted to contact with a fixed contact 59 in the conductor 41 and the switch 34 is here shown as of the usual push button type which is properly connected up to the apparatus and system in the manner shown in my before mentioned application. In this construction the light 47 is disposed within the casing and a bull's-eye lens 47' projects the light through the end of the casing so that it may be readily seen by the nurse.

With the construction above described when the sender closes the switch 34, the drum 10 is turned one step as previously described to display one of the designations such as the word "Nurse". On successive opening and closing of the circuit through the solenoid 26 by opening and closing the switch 34 the designations on the drum are brought into indicating position and the circuit is opened and closed until the desired designation is in indicating position. In the system in which this apparatus is designed to be used one of the indicators is on a board in what is called the "nurse's station" and the switch 34 is within reach of the patient so that the patient may operate the switch to display the proper designation on the board and thus let the nurse know what he wants. The nurse on fulfilling the patient's want closes the switch 42 which energizes the electromagnet 39 and the drum is returned to normal position as previously described. In the before mentioned system I also use another indicator shown in Figs. 9 to 11 inclusive at the bed of the patient and the present device is also designed to be properly connected up for this purpose. The light 47 is lighted as previously described through the operation of the indicator to attract attention to the indicator and also to illuminate it and show up the designations on the drum.

The invention thus exemplifies a simple and efficient form of indicator for the purpose described.

What I claim as my invention is:

1. In an electrical signaling system, a

visible indicator comprising a drum having designations thereon and provided with a gear, a rack, a shaft, a gear mounted on said shaft and meshing with said rack, a second gear mounted on said shaft and engaging said drum gear, a clutch connection between said second gear and first gear for intermittently turning the drum to successively display the designations thereon, means for retaining the drum in any one of its display positions, an electrical circuit including a source of current, an electromagnet for operating said rack in one direction, a release electromagnet for moving said rack in the opposite direction, a spring for returning said rack to normal position, means operated by the release magnet for throwing out the clutch connection, and means for returning the drum to normal position.

2. In an electrical signaling system, a visible indicator comprising a drum having designations thereon and provided with a gear, a shaft, a gear mounted on said shaft and meshing with the gear on the drum, a second gear mounted upon said shaft, a one way clutch connection between the gears on said shaft, a rack engaging said second gear on said shaft, an electrical circuit including a source of current, an electromagnet for operating said rack in one direction, means for retaining the drum in any one of its display positions, a release electromagnet for moving said rack in the opposite direction, a spring for returning said rack to normal position, means operated by the release magnet for throwing out the clutch connection, and means for returning the drum to normal position.

3. In an electrical signaling apparatus, a shaft, an indicating drum revolubly mounted thereon, means for maintaining the drum in normal position, a second shaft, a member revolubly mounted thereon, a driving connection between said member and said drum, a gear mounted on said second shaft, a clutch connection between said gear and said member, a rack meshing with said gear, an electrical circuit including a source of current, an electromagnet for operating said rack in one direction, means for retaining the drum in any one of its display positions, an electromagnet for moving said rack in the opposite direction, means for returning the rack to normal position, and means controlled by the movement of the rack for throwing out the clutch connection.

4. In an electrical signaling system, a visible indicator comprising a casing having an opening therein, a drum having designations thereon, a slide, a connection between said slide and drum for intermittently turning the drum to successively display the designations at the opening in the casing upon the actuation of said slide, means for retaining the drum in any one of its display posi-

tions, an electrical circuit including a source of current, an electro-magnet for operating said slide in one direction, and a control switch for said circuit, a spring for returning the slide, and means for returning the drum to normal position including a second electro-magnet in connection with the source of current and having an independent operating switch, said electro-magnet, when energized, moving the slide in a reverse direction.

5. In an electrical signaling system, a visible indicator comprising a casing having an opening therein, a drum having designations thereon, a slide, a connection between said slide and drum for intermittently turning the drum to successively display the designations at the opening in the casing upon the actuation of said slide, means for retaining the drum in any one of its display positions, an electrical circuit including a source of current, an electro-magnet for moving said slide in one direction, a release electro-magnet for moving said slide in the

opposite direction, means for returning said slide to normal position, means operated by the release magnet for disconnecting said connection, and means for returning the drum to normal position.

6. An electrical signaling system comprising a drum having designations thereon, a slide and a clutch member in connection therewith and operable to rotate the drum and successively display the designations thereon, means independent of the clutch member for retaining the drum in any one of its display positions, means operable by said slide for disconnecting the clutch member, means carried by the clutch member for releasing the retaining means upon the disconnection of the clutch member, and means for returning said drum to normal position upon the disconnection of the clutch member and the release of the retaining member.

In testimony whereof, I affix my signature.

BORNETT L. BOBROFF.